

**Notes from Great Lakes Fleet Assessment, Management and Science Support Discussion  
February 16, 2022 from 1:15 PM to 4:30 PM EST.  
Virtual Meeting held on Zoom**

**Recording of discussion:**

[https://us02web.zoom.us/rec/play/gjJuaknXG8hrYBxqB86ec5Ya4cCWu43IZLZXIgw168QiK0YEnmntvS\\_MQOY6\\_u3vScLz2ateTif9E-FN.AKUKDu8nMfsxQc45?continueMode=true](https://us02web.zoom.us/rec/play/gjJuaknXG8hrYBxqB86ec5Ya4cCWu43IZLZXIgw168QiK0YEnmntvS_MQOY6_u3vScLz2ateTif9E-FN.AKUKDu8nMfsxQc45?continueMode=true)

**Welcome and Introductions – Review of Agenda**

Tom Crane, Great Lakes Commission (GLC) and Mark Burrows, International Joint Commission (IJC) welcomed attendees to the 2022 Great Lakes Fleet Assessment, Management and Science Support Discussion. On behalf of the IJC's Science Advisory Board, Mark thanked everyone for participating in the meeting.

**Science Plan Updates:**

**USGS Great Lakes Science Forum Update – John Hortness, USGS**

The USGS was designated appropriations from Congress back in 2019 to host a collaborative forum with federal, state, Tribal partners, academia, and other interested stakeholders to share current science, identify data gaps and areas of concern, and to prioritize next steps and identify resources needed for a Great Lakes integrated science. John discussed progress on the forum and highlighted that they have tried to get tribal input, as well as the IJC, Great Lakes Commission and other NGOs and federal agencies (NOAA and EPA). The final report was submitted to Congress in July 2021 which is a committee document for internal use only. Not long after submitting to the committee, they requested a public version. There was significant stakeholder interest. This led to the USGS open file report and the public file was made available in October 2021. Some of the major findings from the forum included a need to create new science, including the exploration of advanced technologies. These technologies include: next generation sensors, deployment of autonomous technologies, high-performance computing capabilities, and initiation of critical science activities under ice conditions. Addressed fundamental deficiencies which included expanded data collection, early detection, early warning, rapid response, etc. Another large message that USGS heard was to develop and test enhanced and/or new models and provide more structured coordination amongst stakeholders (enhancing, not duplicating efforts). John says that they are now on hold, waiting for additional guidance from Congress. In the meantime, USGS is continuing to work with partners and stakeholders to identify and fulfill Great Lakes science needs.

Link to USGS Report: <https://pubs.er.usgs.gov/publication/ofr20211096>

**IJC Binational Decadal Science Plan Project – David Burden, IJC**

David says that while we have made tremendous progress, there is much room for improvement and emerging threats to be concerned about. Particularly, he mentioned he is concerned about aquatic invasive species and invasive mussels. David says they have changed the Great Lakes ecosystem. He emphasized that we need to have a plan in place to address these new emerging threats. In addition, we need the science to inform our policy decisions. New pressures are affecting the ecosystem and regional economies of the Great Lakes. Communities across the basin are looking for solutions to respond to new pressures along with pressures yet to be identified. He claims it is critical that we collect the needed

information and understanding to forecast change, mitigate impacts and restore and preserve the Great Lakes ecosystem. David says that we cannot restore, protect, or forecast the future unless you know how it works. The process he highlights is as follows: Exploration and process studies + Data + Models → Policy → Restoration, Protection, Sustainability. The Binational Decadal Science project plan is nearly complete. The project was started in 2019, over that period, they have brought together nearly 700 scientists and were able to identify science gaps and needs. The draft science plan is being finalized and should be ready for commissioners in the spring and summer and then available by next year. The current Great Lakes Annual Research and Monitoring Budget is only \$250 million, less than 2% of total Great Lakes funding. Dave says they are identifying the funding for science gaps and estimate that it would take \$1 billion over the next 10 years to address the Great Lakes science needs. Some of the science gaps and needs are as follows:

- How will climate change affect the Great Lakes ecosystem?
- What happens in the lakes during the winter?
- How are chemical cycles and food webs changing due to invasive species and changing contaminant loads?
- How can harmful cyanobacteria blooms be eliminated; also, dead zones and macroalgae?
- How can modern scientific techniques and tools be applied most effectively?
- How can the lake-related needs of underserved groups be met more effectively?
- How can ecosystems and the services they provide be quantified, restored, protected, and managed more efficiently and sustainably?

The Draft Investment Priorities include:

- Recruit and train new scientists and engineers from the technician to senior scientist levels
- Address critical gaps in the understanding of the ecosystem e.g., a Winter Research Initiative to understand what is happening during the least understood, most under-sampled, and fastest changing time of the year
- Develop and implement the research and monitoring infrastructure including, a backbone of long-term monitoring stations and programs, data management, and high-resolution model forecasting systems
- Establish Centers of Excellence to advance interdisciplinary science inquiry to support management, policy, and economic decision-making

**Lessons learned from winter limnology on the Great Lakes (panel discussion)- Jerry Popiel, USCG-Ninth District; Mike McKay, University of Windsor, GLIER; Peter Esselman, USGS; Steve Ruberg, NOAA/GLERL; Michael Twiss, IJC-SAB, Clarkson University**

Mark Burrows introduces Casey Godwin, Assistant Research Scientist at the University of Michigan as part of the Cooperative Institute for Great Lakes Research, Casey works closely with GLERL. He moderated the panel discussion with the panelists listed above.

Jerry Popiel with the Coast Guard Ninth District kicks off the panel discussion. Over the course of 2011-2014, three U.S. Coast Guard R & D studies were conducted in the Straits of Mackinac, Lake Huron. Studies culminated in 2017 Federal On-Scene Coordinator (FOSC) Guide for Oil in Ice. Jerry talks about how they currently have an R & D center in New London, CT, it currently has 4 projects relevant to the today's discussion. Here are 4 of the current missions:

- One project is focusing on advancing UAS and AUV capabilities to characterize water column and surface oil in ice environments.
- Behavior of Diluted Bitumen (Dilbit) in freshwater.
- Freshwater In-Situ Oil Burn Research
- Emerging Pollution Response Technology Evaluation
- Coast Guard Remotely-Operated Vehicle – Low Cost (ROV-LC) Program
  - Limited regional program in its first year – purchased 10 units
  - Conducting initial training and testing
  - Intended for sub-surface oil and hazardous material detection, trajectory tracking, environmental impacts, damage

The 2018 Coast Guard Authorization Act directed establishment of GLCOE to create this center of expertise for oil spill response research preparedness. GLCOE is doing a lot of work on invasive species programs, detection of oil and ice, spills of opportunity, NOAA ERMA Enhancements and more.

Guide for Oil in Ice:

<https://homeport.uscg.mil/Lists/Content/Attachments/43701/USCG%20FOSC%20Guide%20-%20Oil%20in%20Ice.pdf>

### **Great Lakes winter limnology facilitated by *Operation Coal Shovel* - Mike McKay, University of Windsor, GLIER**

Mike has been active in Great Lakes research over the last 25 years with both the Canadian and U.S. Coast Guards. A lot of work being done currently with winter limnology is through a partnership called “Operation Coal Shovel”, which started in 2009. Mike works with joint coast guards to take winter grab samples. Some of the challenges associated with the program are funding to sustain winter research, not a dedicated science vessel, science is not the main priority, need an advocate to access this resource, term-limited command (U.S. vessels).

### **Winter Sampling needs at Great Lakes Science Center - Peter Esselman, Research Fisheries Biologist, USGS**

Says that we have conducted very little winter research to date because it is often difficult conditions to work in. We normally treat spring (April) as winter in terms of research because the water is often still very cold. Peter says we are in a position to ask important questions around fisheries management. In the last 50 years there has been a big focus on lake trout restoration. Peter is interested in what impedes native fish populations and what can be done to reduce impediments. Many fishes of interest spawn in November-December, egg incubate overwinter, larvae emerge in Feb-May (Lake Trout, Cisco, Lake Whitefish, Kiyi), all requires winter sampling. To ensure that these species grow into adults, we need to conduct research during winter months and collect samples of eggs, larvae and juveniles with the habitat/environmental conditions known to accurately measure mortality rate. Need improved information during winter months such as light, turbidity, and more to understand what factors may impact fish mortality. Some information still needed is to determine the habitats where Bloater and Kiyi spawn, winter distributions of round goby, Saginaw Bay dissolved oxygen, status of incubating Lake Trout eggs in specific habitats, status of incubating Coregonine eggs in specific habitats, and more.

## **Development of a Winter Ecosystem Observation Capability Using Cabled Instrumentation and Autonomous Underwater Vehicle Technologies - Steve Ruberg, NOAA/GLERL**

Steve talks about measuring enough parameters to get data necessary for Great Lakes management. Water sample collection and processing for chemistry and biology supported by observations from their real-time station. A short-cabled system with vertical profiler should be used later this year. NOAA/GLERL really wants to get an AUV deployed. Observations of winter ecology have been difficult to obtain relative to the summer open-water period when most field work occurs. Advancements in autonomous underwater vehicle technology may now make winter ecosystem observations achievable even under ice-cover. Having real-time monitoring systems allows you to view events as they are happening.

### **Michael Twiss, IJC-SAB, Clarkson University**

Michael was also involved in the winter grab from the hydropower dam in Lake Superior. Michael says the winter is highly overlooked and provides challenges for taking samples. Michael oversaw a Great Lakes Winter Science (GLWinS) study that looked at examining emerging technologies across the Great Lakes for assessing aquatic condition in the Great-Lakes St. Lawrence River system. The survey that was part of the study expressed that the way we are currently managing the Great Lakes is currently based on samples collected during the warm months, which is just a snapshot considering the lakes are cold most of the year. The three main objectives of the Great Lakes Winter Science Project include: The survey looked at the status of winter science as it affects the quality of the Great Lakes and their watersheds, assess existing research needs and proposed solutions, provide recommendations (specific, measurable, attainable, relevant, and timely). The proposed project will begin as soon as April 2022. Michael emphasizes that the lakes are very vulnerable to ice-loss with a changing climate. Some of the planned tasks include: create a working group from the Great Lakes community, literature review and database summary, input from stakeholders and rights holders and 2 workshops.

### **Informal agency updates - Deborah Lee from NOAA, Great Lakes Environmental Research Lab is the moderator for this session.**

Beth from EPA gives an update that their research vessel needs a new engine block so they will not be able to use it until July. They are currently in contact with other agencies so they can possibly resume sampling in June with another vessel.

Deborah Lee gives an update from NOAA. She said there are no new vessels on the horizon. However, they are reevaluating the fleet plan and hope to have some new vessels soon. Deborah also mentions that we now have 2 sanctuaries in the Great Lakes. The Wisconsin Shipwreck Coast National Marine Sanctuary was officially designated in August 2021. There has also been another nomination for a sanctuary in Lake Erie and one proposed in Ontario. NOAA has an agreement with the Viking expedition for the Octantis and the Polaris, Octantis is on its first voyage to Antarctica. With respect to GLERL, NOAA has acquired a survey SWATH from the Navy that will be used later in the year. Also acquired a 30-foot boat to support some of the early work in the Wisconsin National Marine Sanctuary.

Peter Esselman gives an update on the RV-Sturgeon, they will likely not be able to use it this year for samples but will instead use RV-Musky and focus primarily on invasive species and climate change. Tim Johnson, MNR gives an update that two new mid-size vessels were added to their fleet. Patrick from

MDNR gives an update on administration changes. They got rid of Assistant Captain position. They now have dual captains, and they pick who is in charge for any day or week. No longer to bring captains on board unless they have a fisheries background.

Debbie asked the panel if Covid-19 has impacted their agencies budgets and operations. Peter said that they can get into Canada to do work in Lake Ontario but were not able to land in Canada to do some of their surveillance work. Justin from Ohio State University says that they are hoping to have a full and complete 2022 season.

#### **Wrap up and final thoughts – Tom Crane, GLC and Mark Burrows, IJC**

Tom reiterated that the GLASS workshop the next day will complement what we heard during today's meeting. Tom thanks Debbie Lee for being a moderator and coordinating discussion and Mark for his leadership and the Science Advisory Board for their interest in continuing these discussions and workshops.

***Meeting adjourned (4:10 PM EST)***